

PATENT  
Atty. Dkt. No. AMAT/1931USA/MD/COPPER/DV

21. The method of claim 15, where in the metal layer is copper.

## REMARKS

This is intended as a full and complete response to the Final Office Action dated July 9, 1999.

Claims 1, 5, 15, 18, and 20 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The Examiner asserts that replacement of "hole" with "feature" essentially adds new matter. Applicants disagree that the term "feature" is new matter since the specification teaches at page 6, lines 20-22, that the present invention broadly encompasses filling of features. Withdrawal of the rejection is respectfully requested.

Claims 1-8, 11-14, and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Taguchi et al.* in view of *Ho et al.*, and further in view of *Barnes et al.* and *Bunshah*, on grounds that the combination of references shows each feature of the claimed invention. Applicants respectfully traverse the rejection on grounds that the combined references do not teach, show, or suggest depositing a first barrier layer within a feature, etching the bottom of the feature, depositing a second barrier layer comprising Ta, TaN, TaSiN, TiSiN, in the feature, and then depositing copper on the barrier layer. The Examiner fails to identify any suggestion or motivation for combining the aluminum deposition method of *Taguchi et al.* with copper deposition. *Taguchi et al.* describes a combination of barrier layers that reduce oxidation of titanium to improve aluminum deposition. The Examiner has not cited a proper basis for combining the various barrier layer deposition steps of *Taguchi et al.* with the copper deposition steps of *Ho et al.* Applicants are unable to further address the Examiner's reasons for combining the references because the reasons have not been asserted. The combination of references must be based on more than identifying each element of an invention in one of the references since non-obvious combinations of old elements are patentable. Withdrawal of the rejection is respectfully requested.

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Claims 15-18 and 20 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by *Taguchi et al.*, on grounds that the reference discloses all elements of the claimed method for depositing  $\text{Si}_x\text{N}_y$  layers. Applicants respectfully traverse this rejection on grounds that the claims as amended include the novel combination of depositing a barrier layer that is etched to expose an underlayer within a feature, and selectively depositing a metal layer on the underlayer to fill the feature as described in the specification for Figs. 7-11. *Taguchi et al.* describes deposition of a non-selective barrier layer on all surfaces including the underlayer prior to filling the feature with metal. The non-selective barrier layer is not etched to expose the underlayer as claimed by Applicants. Withdrawal of the rejection is respectfully requested.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent than the primary references cited in the Office Action. Therefore, it is believed that a detailed discussion of the secondary references is not necessary for a full and complete response to this Office Action.

In view of the above, Applicants request entry of the amendment to correct matters of form, and allowance of claims 1-8, 11-18, and 20-21.

Respectfully submitted,

  
Keith M. Tackett  
Registration No. 32,008  
THOMASON, MOSER & PATTERSON  
3040 Post Oak Blvd., Suite 1500  
Houston, Texas 77056  
Telephone 713/623-4844  
Facsimile 713/623-4846  
Attorney for Applicant

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